REMARKS

The present invention is directed to a mobile communication terminal that can be used in adaptive array antennas, and more particularly, to an improvement that addresses the problems that can occur with weak electric fields, interference, and loss of synchronization when the mobile communication terminal does not receive transmitted signals properly from a base station. In such circumstances, if the mobile communication terminal fails to properly receive signals, it will then not be capable of calculating a proper weight vector from the received signals to generate a directivity pattern towards the intended base station. Accordingly, neither the mobile communication terminal nor the base station can provide appropriate directivity patterns towards the other device.

The present invention provides a specific solution as set forth in our claims for addressing this problem in an adaptive array method. Our invention is capable of detecting an error in the reception signal from the transmitting source and then controls the transmission unit in the mobile communication device to provide an alternative pattern such as a non-directional pattern that can be utilized with an antenna having the largest antenna gain among the plurality of antennas that are available. As a result, the present invention increases the probability of sending signals that can be appropriately received by the intended base station, and an interactive detection, recognition and remedial signal processing is provided, as set forth in our current claims. As can be readily appreciated, by adapting the mobile communicational terminal to address these problems, and utilizing a preferred transmission pattern from the appropriate antenna, not only will the performance characteristics of the mobile communicational terminal using this system be improved, but there will be less interference with other base stations resulting from erroneous high directivity transmission towards such base stations.

The Office Action rejected Claims 9-12 under 35 U.S.C. § 101. It is believed that this rejection is now moot in view of the amendment of Claims 9-12 to add a computer readable medium pursuant to MPEP § 2105. If there any remaining questions as to the formality of the claim language, the undersigned attorney would appreciate a telephone conference.

The Office Action rejected Claims 1-8 as being unpatentable over the *Akaiwa et al.* (U.S. Patent No. 5,710,995), in view of *Kirisawa* (U.S. Patent No. 6,297,780). The *Akaiwa et al.* reference was directed to the basic structure of a mobile communication terminal and method for performing reception and transmission within an adaptive array method. It recognized the use of a plurality of antennas and a reception unit for forming a directivity pattern to receive a signal. The Office Action contended that the mobile communication terminal had the capacity of detecting a reception error in the reception signal.

However, the Office Action admitted that *Akaiwa et al.* does not teach nor even recognize the method proposed by the present invention.

The Office Action contended that the *Kirisawa* reference was applicable from a related art to suggest a modification of the *Akaiwa et al.* mobile communication terminal to increase the likelihood of a transmitted signal to reach its desired destination.

The Office Action further rejected Claims 9-12 as being unpatentable over the *Akaiwa et al.* reference in view of the *Kirisawa* and *Keirinbou* (U.S. Patent No. 6,285,893). The Office Action contended that in the related art of portable radio devices with a plurality of antennas, the *Keirinbou* reference was capable of teaching the execution of a program by a computer to implement the method suggested by *Kirisawa*.

Applicant respectfully traverses this rejection and believes that the references were inadvertently combined without a teaching reference to suggest the present invention.

> Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references. See, e.g., C.R. Bard, Inc. v. M3 Sys., Inc., 157 F.3d 1340, 1352, 48 USPQ2d 1225, 1232 (Fed.Cir.1988) (describing "teaching or suggestion or motivation [to combine]" as an "essential evidentiary component of an obviousness holding"); In re Rouffet, 149 F.3d 1350, 1359, 47 USPQ2d 1453, 1459 (Fed.Cir.1998) ("the Board must identify specifically ... the reasons one of ordinary skill in the art would have been motivated to select the references and combine them");
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> *In re Anita Dembiczak*, 50 USPQ2d 1614 (Fed. Cir. 1999).

Additionally, even if hypothetically accepting the combination of references as being based upon a teaching from the *Kirisawa* disclosure, it is respectfully submitted that the current claims are patentably distinct over this combination of references.

The *Kirisawa* (U.S. Patent No. 6,297,780) was attempting to facilitate communications via communication satellites without increasing a transmitter circuit in size and power requirements. It teaches a plurality of antennas (e.g., two) having different directivities from each other and includes a switch circuit or selector circuit that can be controlled to select one of the antennas for connection to the transmitter circuit in accordance with a reflected power detected from one of the antennas.

In the preferred disclosure in each of the embodiments, that is, Figure 1 and Figure 6, two antennas 14 and 15 are described, although in Column 4, it mentions that more than two antennas can be utilized. The switch circuit or selector circuit basically selects between one or the other antenna based upon a feedback of the radio waves reflected from an interference such as a human, wall, building, etc. As seen, the helical antenna apparatus of Figure 2A has only two distinct directivities, and *Kirisawa* indicates that the prior art omnidirectional radiation pattern

would not be implemented because of its low gain. Thus, *Kirisawa* teaches selecting one of two transmission antennas, each of which has different directivities from each other. (See Column 4, Lines 9-15, and Figure 7.) *Kirisawa* offers a solution directed to a satellite system that presumably can address the different relative elevational angles of satellites.

The *Kirisawa* reference would suggest in a mobile communication system, a transmission of a radio wave by selectively using an antenna that has directivity in a horizontal plane and an antenna that has directivity in a vertical plane. It monitors the reflected wave of a radio wave from the antenna, to thereby determine whether or not an obstacle exists in the direction of the antenna. A predetermined threshold value is utilized to measure the strength of the signal and to activate the selection of the alternative antenna.

Claim 1 is directed to a mobile communication terminal for performing reception and transmission using an adaptive array method, the mobile communication terminal being provided with (a) a plurality of antennas, (b) reception means for forming a directivity pattern for receiving a desired reception signal from a base station and receiving the reception signal from the base station using the formed directivity pattern, and (c) transmission means for transmitting a transmission signal using the directivity pattern formed in reception, the mobile communication terminal comprising: detection means for detecting a reception error in the reception signal; and transmission control means for controlling the transmission means when the detection means detects the reception error so that a pattern different from the directivity pattern formed in reception is formed and the transmission signal is transmitted in the formed pattern instead of the directivity pattern formed in reception.

Kirisawa discloses a mobile communication system in which the terminal detects the reflected wave of the radio wave transmitted from the terminal itself and attempts to select a

different antenna with a better directivity based on a predetermined threshold value. The *Kirisawa* reference, however, does not disclose a construction in which the terminal receives a signal from the device with which the terminal is in communication and, based on that transmission signal, changes the antenna directivity as a result of processing information from the received signal. Claim 1 defines a signal from a base station and changes the antenna directivity upon detecting a reception error in the received signal. Accordingly, neither *Kirisawa* nor any of the other references of record disclose a detection step nor a transmission control step in the manner described and utilized to implement the improvements in an adapted array method of the present invention. In fact, *Kirisawa* teaches away from omnidirectional radiation pattern and, more importantly, does not provide a decision-making step based upon detection of a reception error in a received signal in order to switch to a different transmission pattern.

Suppose an obstacle exists between a mobile communication terminal and a device with which the terminal is communicating, and the obstacle is formed using a material that reflects one part of a radio wave and allows another part of the radio wave to pass through.

In the case of *Kirisawa*, if a part of a radio wave transmitted from the terminal of *Kirisawa* is reflected by the obstacle and received by the terminal, the terminal judges that an obstacle exists, and changes the directivity of the radio wave by switching to another antenna with a different predetermined directivity. As a result, the radio wave cannot reach the intended destination which is located beyond the obstacle.

In the case of Claim 1, if a signal transmitted from the device passes through the obstacle and is received by the terminal of Claim 1, the terminal transmits a radio wave in the transmission direction of the received signal, that is, in the direction toward the intended

destination beyond the obstacle. As a result, the radio wave can reach the intended destination by passing through the obstacle.

The terminal of *Kirisawa* changes between directivity patterns based on the detection of a reflected wave of a signal transmitted by itself. This differs from the terminal of Claim 1 which changes the directivity pattern based on the detection of a reception error of a signal transmitted from a device with which the terminal is communicating. Thus, even if the technique of determining the reception quality disclosed by *Akaiwa* is incorporated in the construction of *Kirisawa*, it would not suggest the invention of Claim 1 having the above effects.

Akaiwa determines the reception quality based on a beat frequency component, an average voltage, and a pilot signal, and is different from the present invention which detects a reception error based on the number of errors in a unique word of a reception signal. This difference further demonstrates the use of hindsight in any combination of *Akaiwa* and *Kirisawa*.

New Claim 13 is directed to a transmission/reception mechanism using an adaptive array method that can detect a reception error from a desired reception signal. If the reception error is not detected, the ordinary adaptive-array transmission/reception procedure is performed whereby the same directivity pattern as the one formed by the reception circuit is formed by the transmission circuit. If the reception error is detected, the different directivity pattern from the one formed by the reception circuit is formed by the transmission circuit. The terminal of Claim 13 is characterized by the construction of changing the directivity pattern based on the detection of a reception error of a signal received from a base station. This is clearly different from the terminal of *Kirisawa* which changes the directivity pattern based on the detection of a reflected wave of a signal transmitted from the terminal itself. Therefore, Claim 13 is unobvious over the prior art, for the same reason as Claim 1.

The dependent claims add additional features neither taught nor suggested by the references of record.

In view of the above comments and submission of the newly drafted claims, and amended claims, it is believed that the case is now in condition for allowance, and an early notification of the same is requested.

If the Examiner believes that a telephone interview will help further prosecution of the present case, the undersigned attorney can be contacted at the listed phone number.

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on December 10, 2004.

By: Sharon Farnus

Signature

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Very truly yours,

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